

IN THE CLAIMS

Please add claims 63-74. The current status of the claims is reflected in the below listing of claims.

1. - 29. (Canceled)

30. (Previously Presented) A method for electrolytic deposition of bronze onto a substrate, the method comprising:

(i) immersing the substrate in an aqueous acidic electrolyte having a pH less than about 1 and comprising:

- a) tin ions;
- b) copper ions;
- c) an alkylsulfonic acid;
- d) an aromatic, nonionic wetting agent; and
- e) an oxidation inhibitor;

wherein a ratio of tin ion concentration to copper ion concentration is sufficient to electrolytically deposit a bronze having a copper content of greater than about 60%; and

(ii) applying a current at a current density sufficient to electrolytically deposit bronze having the copper content greater than about 60% onto the substrate.

31. (Previously presented) The method of claim 30 wherein the alkylsulfonic acid is present in the electrolyte at a concentration of from 140 to 382 g/L of electrolyte.

32. (Previously presented) The method of claim 30 wherein the alkylsulfonic acid comprises methanesulfonic acid in a concentration of at least about 290 g/L.

33. (Previously Presented) The method of claim 30 wherein the oxidation inhibitor is selected from the group consisting of monohydroxybenzene compounds, polyhydroxybenzene compounds, and a combination thereof.

34. (Previously Presented) The method of claim 30 wherein the electrolyte comprises a dihydroxybenzene compound as the oxidation inhibitor.

35. (Canceled)

36. (Previously presented) The method of claim 30 wherein the aromatic, nonionic wetting agent is present in the electrolyte at a concentration of from about 2 to about 40 g/L.

37. (Previously presented) The method of claim 30 wherein tin methanesulfonate is present in the electrolyte in an amount of from about 5 to about 195 g/L of electrolyte, thereby providing the tin ions at a concentration of from about 2 to about 75 g/L of electrolyte.

38. (Previously presented) The method of claim 30 wherein copper methanesulfonate is present in the electrolyte in an amount of from about 8 to about 280 g/L of electrolyte, thereby providing the copper ions at a concentration of from about 2 to about 70 g/L of electrolyte.

39. (Canceled)

40. (Previously Presented) An aqueous acidic electrolyte comprising:

- a) tin ions;
- b) copper ions;
- c) an alkylsulfonic acid;
- d) an aromatic, nonionic wetting agent; and
- e) an oxidation inhibitor;

wherein the aqueous acidic electrolyte has a pH less than about 1 and a ratio of tin ion concentration to copper ion concentration is sufficient to deposit a bronze having a tin/copper ratio of about 40/60, about 20/80, or about 10/90.

41. (Previously presented) The electrolyte of claim 40 wherein the alkylsulfonic acid is present at a concentration of from about 140 to about 382 g/L of electrolyte.

42. (Previously presented) The electrolyte of claim 40 wherein the alkylsulfonic acid comprises methanesulfonic acid.

43. (Previously presented) The electrolyte of claim 40 wherein the alkylsulfonic acid comprises methanesulfonic acid in a concentration of at least about 290 g/L.

44. (Previously presented) The electrolyte of claim 40 wherein the oxidation inhibitor is selected from the group consisting of monohydroxybenzene compounds, polyhydroxybenzene compounds, and a combination thereof.

45. (Previously presented) The electrolyte of claim 40 comprising a dihydroxybenzene compound as the oxidation inhibitor.

46. (Previously presented) The electrolyte of claim 40 wherein the aromatic, nonionic wetting agent is present in the electrolyte at a concentration of from about 2 to about 40 g/L of electrolyte.

47. (Previously presented) The electrolyte of claim 40 wherein the tin ions are present at a concentration of from about 2 to about 75 g/L of electrolyte, and the copper ions are present at a concentration of from about 2 to about 70 g/L of electrolyte.

48. (Previously presented) The electrolyte of claim 40 further comprising a wetting agent selected from the group consisting of an anionic wetting agent, an aliphatic, nonionic wetting agent, and combinations thereof.

49. (Previously Presented) The electrolyte of claim 40 further comprising a gluconate.

50. (Previously presented) The electrolyte of claim 40 wherein the oxidation inhibitor is hydroquinone.

51. (Currently Amended) The electrolyte of claim 40 further comprising a brightener selected from the group consisting of aromatic carbonyl compounds, α,β -unsaturated carbonyl compounds, and combinations thereof.

52. (Canceled)

53. (Previously Presented) An aqueous acidic electrolyte containing:

a) divalent tin ions at a concentration of from about 2 to about 75 g/L of electrolyte;

b) divalent copper ions at a concentration of from about 2 to about 70 g/L of electrolyte;

c) an aromatic, nonionic wetting agent at a concentration of from about 2 to about 40 g/L of electrolyte;

d) a stabilizer, complexing agent, or mixture thereof at a concentration of less than about 50 g/L of electrolyte;

e) a wetting agent selected from the group consisting of an anionic wetting agent, a nonionic, aliphatic wetting agent, and mixtures thereof at a concentration of less than about 10 g/L of electrolyte;

f) an oxidation inhibitor selected from the group consisting of monohydroxybenzene compounds, polyhydroxybenzene compounds, and a combination thereof at a concentration of less than about 5 g/L of electrolyte;

g) a brightener at a concentration of less than about 5 g/L of electrolyte; and

h) an alkylsulfonic acid at a concentration of at least about 140 g/L of electrolyte;

wherein the aqueous acidic electrolyte has a pH less than about 1 and a ratio of tin ion concentration to copper ion concentration is sufficient to deposit a bronze having a tin/copper ratio of about 40/60, about 20/80, or about 10/90.

54. (Previously presented) The electrolyte of claim 53 wherein the alkylsulfonic acid comprises methanesulfonic acid.

55. (Previously presented) The electrolyte of claim 53 wherein the alkylsulfonic acid comprises methanesulfonic acid in a concentration of at least about 290 g/L.

56. (Previously presented) The method of claim 30 wherein the ratio of tin ion concentration to copper ion concentration is about 40/60.

57. (Previously presented) The method of claim 30 wherein the ratio of tin ion concentration to copper ion concentration is about 20/80.

58. (Previously presented) The method of claim 30 wherein the ratio of tin ion concentration to copper ion concentration is about 10/90.

59. (Previously presented) The method of claim 30 wherein the current density is at least about 7 A/dm².

60. (Previously presented) The method of claim 30 wherein the aromatic, nonionic wetting agent is β -naphthol ethoxylate.

61. (Previously presented) The electrolyte of claim 40 wherein the aromatic, nonionic wetting agent is β -naphthol ethoxylate.

62. (Previously presented) The electrolyte of claim 53 wherein the aromatic, nonionic wetting agent is β -naphthol ethoxylate.

63. (New) The method of claim 30 wherein the aqueous acidic electrolyte consists essentially of:

- a) the tin ions;
- b) the copper ions;

- c) the alkylsulfonic acid;
- d) the aromatic, nonionic wetting agent; and
- e) the oxidation inhibitor.

64. (New) The method of claim 30 wherein the aqueous acidic electrolyte consists of:

- a) the tin ions;
- b) the copper ions;
- c) the alkylsulfonic acid;
- d) the aromatic, nonionic wetting agent;
- e) the oxidation inhibitor;
- f) an aliphatic nonionic wetting agent; and
- g) a stabilizer/complexing agent.

65. (New) The method of claim 30 wherein the aqueous acidic electrolyte consists of:

- a) the tin ions;
- b) the copper ions;
- c) the alkylsulfonic acid;
- d) the aromatic, nonionic wetting agent;
- e) the oxidation inhibitor; and
- f) a stabilizer/complexing agent.

66. (New) The method of claim 30 wherein the aqueous acidic electrolyte consists of:

- a) the tin ions;
- b) the copper ions;
- c) the alkylsulfonic acid;
- d) the aromatic, nonionic wetting agent;
- e) the oxidation inhibitor;
- f) a brightener; and

g) a stabilizer/complexing agent.

67. (New) The method of claim 30 wherein the aqueous acidic electrolyte consists of:

- a) the tin ions;
- b) the copper ions;
- c) the alkylsulfonic acid;
- d) the aromatic, nonionic wetting agent;
- e) the oxidation inhibitor;
- f) a brightener;
- g) a stabilizer/complexing agent; and
- h) a source of alloying ion selected from the group consisting of zinc ions, bismuth ions, and a combination thereof.

68. (New) The aqueous acidic electrolyte of claim 40 wherein the electrolyte consists essentially of:

- a) the tin ions;
- b) the copper ions;
- c) the alkylsulfonic acid;
- d) the aromatic, nonionic wetting agent; and
- e) the oxidation inhibitor.

69. (New) The aqueous acidic electrolyte of claim 40 wherein the electrolyte consists of:

- a) the tin ions;
- b) the copper ions;
- c) the alkylsulfonic acid;
- d) the aromatic, nonionic wetting agent;
- e) the oxidation inhibitor;
- f) an aliphatic nonionic wetting agent; and

g) a stabilizer/complexing agent.

70. (New) The aqueous acidic electrolyte of claim 40 wherein the electrolyte consists of:

- a) the tin ions;
- b) the copper ions;
- c) the alkylsulfonic acid;
- d) the aromatic, nonionic wetting agent;
- e) the oxidation inhibitor; and
- f) a stabilizer/complexing agent.

71. (New) The aqueous acidic electrolyte of claim 40 wherein the electrolyte consists of:

- a) the tin ions;
- b) the copper ions;
- c) the alkylsulfonic acid;
- d) the aromatic, nonionic wetting agent;
- e) the oxidation inhibitor;
- f) a brightener; and
- g) a stabilizer/complexing agent.

72. (New) The aqueous acidic electrolyte of claim 40 wherein the electrolyte consists of:

- a) the tin ions;
- b) the copper ions;
- c) the alkylsulfonic acid;
- d) the aromatic, nonionic wetting agent;
- e) the oxidation inhibitor;
- f) a brightener;
- g) a stabilizer/complexing agent; and

h) a source of alloying ion selected from the group consisting of zinc ions, bismuth ions, and a combination thereof.

73. (New) The aqueous acidic electrolyte of claim 53 wherein the electrolyte consists essentially of:

- a) the divalent tin ions;
- b) the divalent copper ions;
- c) the aromatic, nonionic wetting agent;
- d) the stabilizer, complexing agent, or mixture thereof;
- e) the wetting agent selected from the group consisting of an anionic wetting agent, a nonionic, aliphatic wetting agent, and mixtures thereof at a concentration of less than about 10 g/L of electrolyte;
- f) the oxidation inhibitor selected from the group consisting of monohydroxybenzene compounds, polyhydroxybenzene compounds, and a combination thereof;
- g) the brightener; and
- h) the alkylsulfonic acid.

74. (New) The aqueous acidic electrolyte of claim 53 wherein the electrolyte consists of:

- a) the divalent tin ions;
- b) the divalent copper ions;
- c) the aromatic, nonionic wetting agent;
- d) the stabilizer, complexing agent, or mixture thereof;
- e) the wetting agent selected from the group consisting of an anionic wetting agent, a nonionic, aliphatic wetting agent, and mixtures thereof at a concentration of less than about 10 g/L of electrolyte;

f) the oxidation inhibitor selected from the group consisting of monohydroxybenzene compounds, polyhydroxybenzene compounds, and a combination thereof;

g) the brightener; and

h) the alkylsulfonic acid.